

YOR919930093US3
Serial Number 10/827,080

AMENDMENTS TO THE CLAIMS

Please cancel claims 1-25.

Please add new claims 26-31 as follows.

1. - 25. (canceled)

26. (new) An apparatus for sensing a magnetic field by the giant magnetoresistive effect comprising:

a substrate;

a layer of ferromagnetic material formed over the substrate, the layer of ferromagnetic material having a plurality of nonmagnetic regions formed therein whereby magnetic flux paths form around each one of the plurality of nonmagnetic regions when the layer of ferromagnetic material is not in a magnetic field, the flux paths being contained completely within the layer of ferromagnetic material and not penetrating into the plurality of nonmagnetic regions, and

means for detecting a change in resistance through the layer of ferromagnetic material as a function of a magnetic field applied to the layer of ferromagnetic material.

27. (new) The apparatus of claim 26 wherein each of the plurality of nonmagnetic regions has dimensions less than about 350 nm.

28. (new) The apparatus of claim 26 wherein:

the layer of ferromagnetic material is formed from nickel, cobalt or alloys thereof, and

the plurality of nonmagnetic regions is formed by diffusing germanium or silicon into the layer of ferromagnetic material.

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29. (new) A method for fabricating a magnetic field sensor comprising:

providing a single crystal substrate having an exposed surface at an angle between 1 to 10 degrees away from a major crystallographic plane;

annealing the single crystal substrate to form an annealed single crystal substrate having a series of atomic scale steps on the exposed surface;

forming upon the series of atomic scale steps a corresponding series of separated magnetic material stripes;

forming upon the series of separated magnetic material stripes and exposed portions of the series of atomic scale steps a blanket non-magnetic conductor material layer; and

planarizing the blanket non-magnetic conductor material layer to form a series of non-magnetic conductor material stripes interposed between and contacting the series of separated magnetic material stripes.

30. (new) The method of claim 29 wherein the series of magnetic material stripes is formed from a ferromagnetic material.

31. (new) The method of claim 30 wherein the ferromagnetic material is selected from the group consisting of iron, cobalt, nickel and alloys thereof.